

D J GOODE

**WEAPONS + BLAST EFFECTS
HOSTILE VEHICLE MITIGATION
ENERGETIC MATERIALS STRUCTURAL JUSTIFICATION
BLAST, BALLISTIC + INDUSTRIAL SAFETY TESTING
FINITE ELEMENT MODELLING
COUNTER TERRORISM + SECURITY**



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EXPLOSIVE SAFETY
& TRAINING
FACILITY

ABOUT US

D J Goode is a leading firm of consulting engineers that was formed in 1993. They have brought together a team of engineers with considerable experience and training in the field of blast, ballistic, protective engineering and security-related design on projects around the world.

All our technical staff have appropriate memberships of professional bodies including, the Institution of

Civil Engineers, the Institution of Mechanical Engineers, the Institution of Structural Engineers, the Institute of Engineering and Technology, the Institute of Explosive Engineers and the Register of Security Engineers and Specialists.

D J GOODE ARE THE **ONLY** INDEPENDENT CONSULTANCY IN THE UK CAPABLE OF PROVIDING **IN-HOUSE** BLAST AND BALLISTIC TESTING.



Liverpool Street Station, London



D J Goode can assist in assessing your assets against the threats/risks posed. These assessments can be undertaken as part of project concept design and continue through to construction on new developments or on existing sites. We can support you throughout all phases of design and can assist you during the construction phase where we are able to provide site supervision of specialist installations if required.

We can provide the expertise that can protect your personnel, assets and facilities from

malicious and non-malicious threats. Solutions can include some or all of the following areas:

- ✓ Blast & Ballistic Design
- ✓ Hostile Vehicle Mitigation
- ✓ Security
- ✓ Testing
- ✓ Specialist Analytics
- ✓ Explosive Safety & Training Facilities
- ✓ Blast & Ballistic Testing
- ✓ Physical & Electronic Safety

D J Goode currently has accreditation with BSI for ISO 9001:2008 (Quality Management System. Requirements) and with UKAS for ISO 17025:2005 (General requirements for the competence of testing and calibration laboratories) for ballistic testing.

BLAST + BALLISTIC DESIGN

In recent times, the need to protect your assets from the hazards that arise from either a terrorist attack or an accidental event (such as an incident at a petrochemical facility) has increased.

D J Goode can assist in assessing your assets against the threats/risks posed. These assessments can be undertaken as part of the project concept design and through to construction, where we can also provide site supervision of the specialist installations if required.

If you have an existing facility, we can assess the assets against new threats, or if you are considering changes in processing or storage of explosive and/or ballistic materials, we can determine the measures needed to maintain operations and meet current legislation.



Canary Wharf,
London

We offer comprehensive structural dynamic design services including blast load derivation, structural analysis, specifications and construction/fabrication drawings, as well as providing general design advice to a project design team.

We can provide structural analyses on a range of materials, including steel, aluminium, reinforced concrete, glass, masonry, timber and composites.

Our Services Include:

- Threat & risk assessments
- Site surveys & inspections
- Blast load derivation
- Blast design of structures
- Specialist analytics
- Ballistic assessments
- Blast testing
- Ballistic testing
- Civil & Structural design
- Technical drawings

HOSTILE VEHICLE MITIGATION

Hostile Vehicle Mitigation (HVM) is a critical aspect of most security schemes and is paramount in maximising standoff from your critical assets.

D J Goode have prepared vehicle dynamics assessments (speed of approach studies) for a large number of sites in the UK and some of across the world, and our engineers have successfully attended the HVM course provided by the National Protective Security Authority (formerly CPNI).

We can prepare bespoke calculations and designs for HVM to suit a range of impact vehicle types and velocities. Furthermore we can specify suitable HVM in accordance with PAS 69 and IWA 14.

The designs we produce for bespoke HVM systems and impact resistant barriers are carried out in accordance with PAS 68 and IWA 14. We can also assist in the arrangement of HVM tests in order to verify the design.



Kings Cross Station, London

Our specialist services include:

- > Site investigations
- > Vehicle Dynamic Assessments
- > Design and specification of suitable protective measures
- > Technical drawings including bar bending schedules for reinforced concrete solutions
- > Specialist analysis and design of Hostile Vehicle Mitigation products
- > Impartial design service



We are proud to be the engineers responsible for the design of the **first impact resistant bollard system** in 2001 which was successfully tested and used on projects around London. We assisted HOSDB in the Research and Development of HVM in 2001 and were one of **the first consultants responsible for assisting with the original development** of PAS 68 and 69.

SECURITY

D J Goode understands that an important part in the protection of assets is to provide physical security measures to prevent unauthorised access to buildings or areas where material may be stored that is of a sensitive or business critical nature. We have undertaken numerous projects where physical security is a key component to protecting assets either against criminal or terrorist activity. D J Goode has developed the capability to analyse potential threats and specify and design physical security measures.

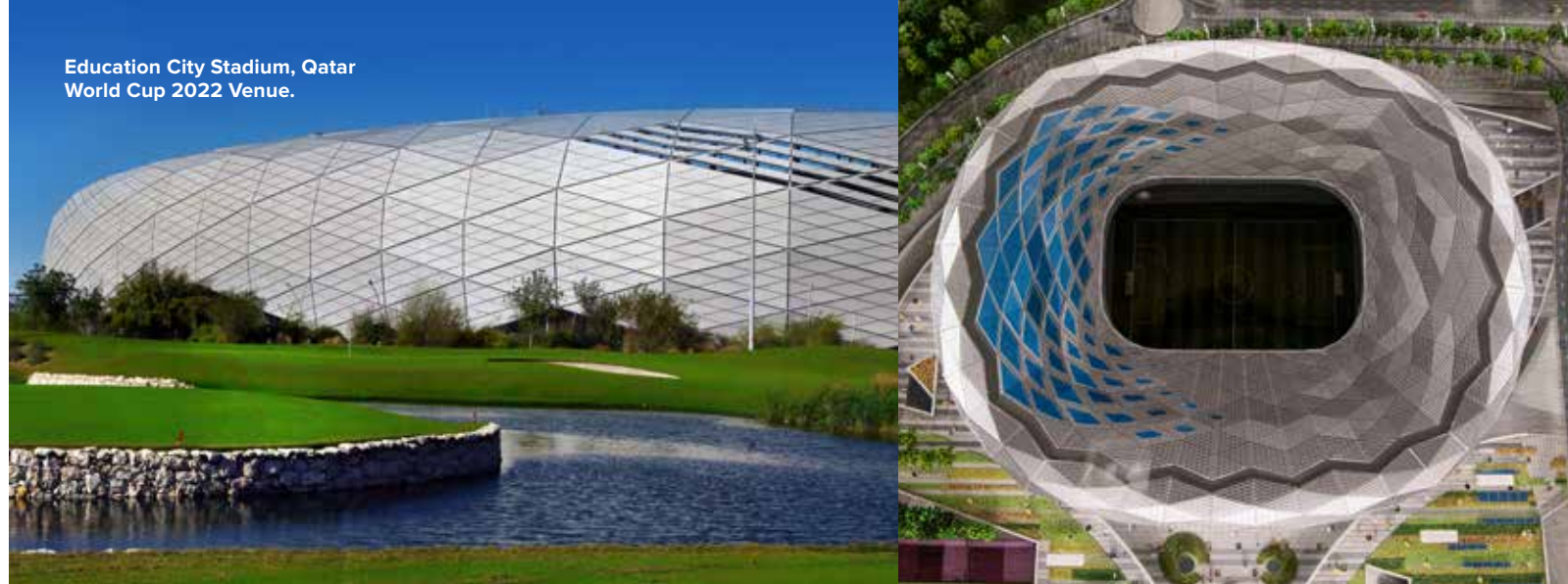
Physical security for assets works on the basis of providing a layered approach to the protection of either personnel or data. Each site is assessed based on the type of asset being protected and the threats that may be assessed as being present.

D J Goode has been involved in projects providing physical security solution for customers including Government departments, military installations and commercial facilities.

D J Goode has experienced engineers who can design and specify a full range of security solutions. In order to meet your needs we can provide the following services:

- ✓ Threat and risk assessments
- ✓ Electronic security systems
- ✓ Physical security (including doors, windows, walling, etc)
- ✓ Perimeter security
- ✓ Site layout advice for new facilities
- ✓ Hostile vehicle mitigation
- ✓ Security audits and surveys for existing facilities
- ✓ Masterplanning security advice
- ✓ Contingency planning

Education City Stadium, Qatar
World Cup 2022 Venue.



A number of our engineers are members of the Register of Security Engineers and Specialists (RSES) which is sponsored by National Protective Security Authority (formerly CPNI) and administered by the Institution of Civil Engineers (ICE).



TESTING

D J Goode are one of the only UK specialist engineering consultancies who run their own blast and ballistic testing programme for commercial clients. We carry out smaller ballistics and blast trials at our offices in Suffolk and larger trials at other sites around the UK, where tests up to 500kg TNT can be undertaken.

Tests are carried out in compliance with relevant national and international codes of practice. D J Goode has a UKAS accredited ballistic facility (4621) for testing to BS EN 1063 and BS EN 1522/1523.

See www.ukas.com for full list of accredited standards.

We carry out ballistic research and development trials using various ammunition and fragment simulated projectiles.

We also have the ability to load our own ammunition to achieve differing projectile velocities to carry out testing such as for VSO trials.



We have developed a number of bespoke tests which are carried out at our site in Suffolk.

- ✓ Blast testing (up to 0.5Kg TNT)
- ✓ Ballistic testing (up to 0.338" Lapua)
- ✓ Hurricane debris testing
- ✓ Small confined vapour cloud explosion tests
- ✓ High-load test table
- ✓ Shockwave testing, using a small shock tube
- ✓ Close-in charges and fragment testing (up to 0.5Kg TNT)
- ✓ Fragment characterisation trials

We also offer a customisation service where we can develop tests in order to meet your specific requirements. *For example we recently developed the test method for hurricane debris testing and understand that we are the only test facility in the UK to offer this service.*



CUSTOMISED TO MEET YOUR REQUIREMENTS

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- Ballistic testing (up to 0.338" Lapua)
- Hurricane debris testing
- Small confined vapour cloud explosion tests
- High-load test table
- Shockwave testing, using a small shock tube
- Close-in charges & fragment testing (up to 0.5Kg TNT)
- Hardness testing
- Pull-out tests

We also offer a customisation service where we can develop tests in order to meet your specific requirements. Examples include STANAG's, ASTM, VSAG, UL752 and NIJ.



With an ISO 9001:2008 certified Quality Management system and UKAS accredited (4621) ballistic testing, we are proud to offer assistance with product development that can include:

- ✓ Testing and certification of ballistic protection materials
- ✓ Design and development of ballistic protection solutions
- ✓ Advice on potential applications and customers

UKAS ACCREDITED BALLISTIC RANGE

UKAS Accredited

Ballistic testing facility (4621)

D J Goode provides an extensive range of testing facilities, such as blast testing and ballistic trials at our tubular firing range in Suffolk.

D J Goode are able to carry out testing to a range of ballistic test including:

BS EN 1063 BS EN 1522 BS EN 1523

A full list of accredited testing standards can be found at www.ukas.com

Our firing range uses a custom built fixed weapon with a range of interchangeable barrels which can be used to fire calibres up to 0.338" Lapua. We also undertake larger calibres on request.



D J Goode have been carrying out ballistic testing since 1999 on a wide range of ballistic protection materials and systems. We are UKAS accredited (4621) to test building materials, doors and glazing systems. We can test a range of materials including glass, concrete, steel and aluminium.

The range of ammunition that we use at our range includes:

- > **0.50" Caliber**
- > **0.22" LR (Rifle)**
- > **0.357" Magnum (Hand Gun)**
- > **5.56 x 45mm (Rifle)**
- > **7.62 x 51mm (AP) (Rifle)**
- > **7.62 x 39mm (AK47)**
- > **9mm Luger (Hand Gun)**
- > **0.44" Magnum (Hand Gun / Carbine)**
- > **7.62 x 51mm (Rifle)**
- > **12 Gauge (Shotgun)**
- > **7.62 x 54(R) (Rifle)**

If you do not see the ammunition you require in the list please contact us, as we are able to meet most requirements including fragment simulation projectiles (FSP) and larger calibres at other facilities.

We reload our ammunition to ensure that we meet requirements set out in standards BS EN 1063 & BS EN 1522 (BRI - BR7, FBI - FB7 and SGI & SG2)

FULL ACCREDITATION
DETAILS AT
WWW.UKAS.COM



FOR RESEARCH OR BS EN CERTIFICATION

As well as providing testing to a range of standards we can also develop a bespoke testing procedure to meet the requirement of your project or product.

- ✓ We can reload ammunition to meet specific impact velocities
- ✓ Our range is air conditioned to provide a temperature controlled environment for testing
- ✓ Samples can be conditioned and tested to a range of test conditions
- ✓ Detailed test reports and test certificates can be produced

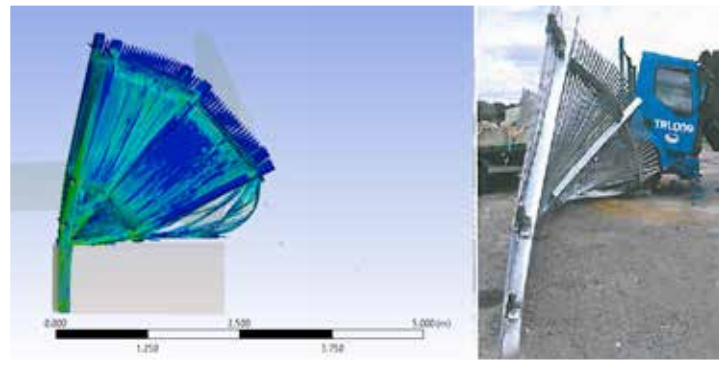


SPECIALIST ANALYTICS

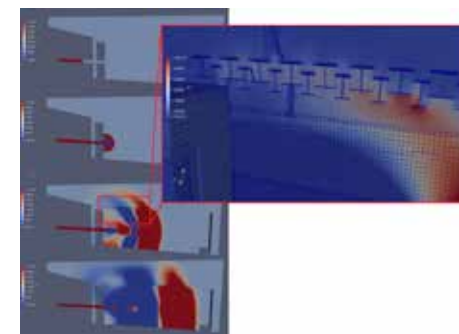
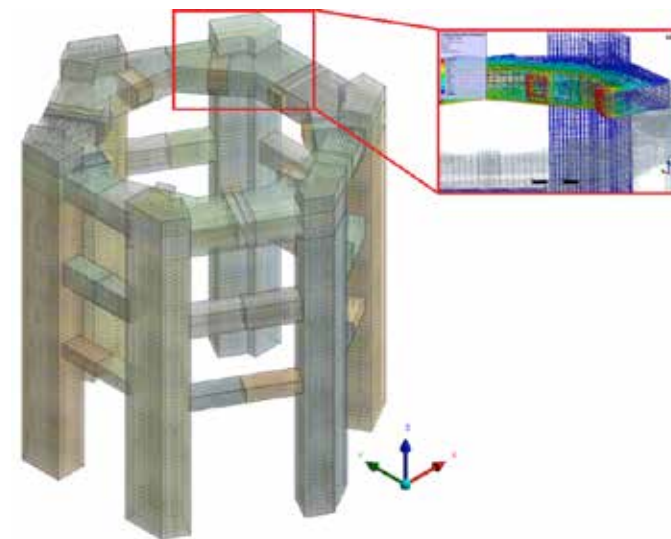
In order to accurately model the response of your systems when subject to blast and/or impact loads it is sometimes necessary to apply specialist analytical methods.

Dynamic assessments can be undertaken using first principles or recognised software packages, depending on the complexity of the problem. Generally single degree of freedom analyses will provide a suitable solution, however in some case it is

more appropriate to apply Finite Element Analysis (FEA) techniques to model the response of steel, aluminium, concrete, glass and composite materials.



We can also accurately determine blast parameters acting on your structures, streetscapes, or area of interest, using hydrocodes (such as Autodyn™ or Air3D)



Our current **FEA** capabilities include:

- > Static and transient elastic and nonlinear analysis
- > Steady state and transient thermal analysis
- > Explicit Fluid Structure Interaction (FSI)
- > CFD / Hydrocode modelling
- > Blast wave simulation
- > Numerical Modelling
- > Bespoke multi degree of freedom dynamic analysis of structures
- > Testing to provide suitable materials data

EXPLOSIVE SAFETY + TRAINING FACILITY



In addition to the main protective engineering side of the business D J Goode also provide explosive safety design advice to the explosive storage and manufacturing industry as well as the petrochemical sector.

We can advise organisations on compliance with the requirements of the Explosives Regulations 2014 (formerly Manufacture and Storage of Explosives Regulations MSER) and JSP482.

D J Goode can develop solutions for existing installations that do not meet the requirements of these regulations and we have considerable experience in the

field of explosives safety. We can provide advice on the siting and design of new explosive storage, processing and manufacturing facilities.

We can provide assistance with producing the required documentation, including building schedules and plans, for new explosive facilities as well as with licence applications in both the UK and around the world.

D J Goode have also successfully completed the design of a number of firing ranges and explosive method of entry (EMOE) facilities for commercial and Government clients. The designs were completed in accordance with guidance provided within JSP403 and handbook of police range safety.

Our services include:

- ✓ Advice on compliance with Explosive Regulations & JSP 482
- ✓ Advice on the design of new explosive storage, processing and manufacturing facilities
- ✓ Support in the submission of License Applications
- ✓ Design of indoor and outdoor Firing Ranges in compliance with JSP 403 and Handbook of Police Range Safety
- ✓ Support in the submission of License Applications



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D J GOODE
THREAT MITIGATION SPECIALISTS